

## **solarZero Submission: Future stability and reliability draft roadmap**

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### **Introduction – about solarZero**

solarZero has nearly 8000 solar and battery systems in the New Zealand market. We monitor these every 5 minutes and can control the batteries, hot water and in future other main household loads such as EV charging. We are in the pre-production environment for reserves and aim to be a full participant in the reserves market in the middle of this year. Panasonic is our technology partner.

The Te Mauri Hiko series of reports set out an exciting and compelling vision for the power system. This FSR roadmap is one, albeit important, part of the process of moving the NZ power system towards that vision. We strongly support the Te Mauri Hiko vision and support the general direction of the FSR roadmap.

We would welcome the opportunity to brief the team leading this FSR work on our technology, the opportunities it offers and the challenges we face in maximising the value of the technology for the power system. For example, we would be pleased to outline the work we are working with Transpower on providing reserves via distributed batteries, some four years ahead of the FSR roadmap timeline.

### **The importance of the regulatory settings**

Regulatory settings and the software that run the power system are key to enabling distributed energy resources to provide stability and reliability services. Leading examples of DER providing services in the US are; New York – particularly the Brooklyn-Queens project, Hawaii and Green Mountain Power. In all these three examples, the regulatory settings were key to enabling DER:

- In New York the regulator required the utility to explore a non-network solution and the regulator supported the development of non-network solutions.
- In Hawaii the regulator instructed the utility to, in effect, turn DER from a problem to a solution by incentivising battery storage and smart control as an addition to solar.
- Green Mountain Power took the initiative and set up systems whereby customers could generate value from household battery storage as part of an overall programme to improve the electricity system.

Similarly in the UK it is the regulation that has enabled DER to provide services to the power system.

In New Zealand changes to the regulatory system seem to take a long time compared to other jurisdictions. For example, in 2022 the Electricity Code was updated to enable batteries to participate whereas in PJM similar changes were made nearly a decade ago.

As a consequence of the change to the Code (enabling batteries) solarZero intends to offer its battery fleet into the reserves market by the middle of this year. The Code and the software operating the system are not quite suitable – we will be viewed as “Tail Water Depressed” hydro generation. solarZero can participate via a few technical “hacks” and the goodwill of all involved.

The combination of technical “hacks” and goodwill is a great Kiwi way of getting things done. But it is not great from the perspectives of investors who want to see a more defined pathway to realising the value of DER in the market. From an investor's perspective it is really important that there is a

clear programme of regulatory change and associated electricity system software development that gives investors the confidence to invest in the development of DER.

### General comments on the FSR roadmap

Firstly, it is great that there is a roadmap. Second, we think that the roadmap identifies the main issues. It is a good starting point. Like all roadmaps it will need refreshing and updating over time.

Our main comment relates to timing, sequencing and a focus on risks as compared to enabling opportunities. Work on updating the Code needs to start now. As the battery/reserves example above highlights, solarZero can only enter the reserves market with distributed batteries because the Code was changed, combined with some technical hacks and good will. We note that the FSR roadmap expects that distributed batteries will be providing existing ancillary services in year 4. We expect to be providing ancillary services (reserves) **this year**, not in four years' time, i.e. we are four years ahead of the timing outlined in the FSR report.

| Activity  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| FSR 8 – Overall outcome   |        |        | ✓      | ✓      |        |        |        |        |        |         |
| FSR 8.1 – Investigate ancillary services  |        |        | ✓      |        |        |        |        |        |        |         |
| FSR 8.2 – Ensure tools monitor the performance of the power system                  |        |        |        | ✓      |        |        |        |        |        |         |
| FSR 8.3 – Update market system to enable DER to provide existing ancillary services |        |        |        | ✓      |        |        |        |        |        |         |

Further, we don't necessarily want to provide *existing ancillary services*. We want to provide ancillary services that reflect the superior capabilities of the technology we have. As outlined above, Transpower will model our distributed batteries as tail water depressed hydro generation (TWD). We can provide much more flexibility than TWD, yet we cannot offer that flexibility until the dispatch software system is enhanced.

A theme in the roadmap is that DER is a problem/risk that needs to be carefully managed. We suggest DER is an opportunity that enables a more efficient and resilient power system. The wording in a number of sections needs to be reviewed to reflect the opportunities that DER provide for improved power system management.

### Specific comments on the FSR roadmap themes

FSR1: Enabling DER for efficient power system operations. Work needs to start on a Code refresh right now together with the associated market software changes, because Code changes and associated software development seems to take so long in New Zealand compared to some overseas jurisdictions.

FSR2: Visibility and observability of FSR. The tone of this section is that DER could be a significant risk to the power system. That thinking needs to be turned on its head. DER has the potential to provide significant benefits and provide opportunities for much better power system management. These benefits/opportunities were outlined in Transpower's Whakamana i Te Mauri Hiko and it is surprising that those benefits are not more clearly outlined in this FSR roadmap.

FSR3: Coordination of increased connection. As with FSR 2, DER are presented as a potential problem. In fact DER presents a significant opportunity. The language in both FSR 2&3 needs to be changed to reflect the benefits that DER can provide to the power system and ways to unlock those benefits. For example, FSR 3.3 identifies the opportunity "*To enable power system operations to benefit from the capability of DER*" but the risk is identified as "*Inappropriate new connection risk*"

*assessments, eroding system security*". The risk here should be something along the lines of *"Power systems operations may not gain the full potential benefits DER can provide"*.

FSR4: Balancing renewable generation. We support the move towards new/additional ancillary services to support more variable renewable generation.

FSR5: Managing reducing system inertia. We support developing a new frequency management strategy. However, we consider 7 years to be too long. Work needs to start now on this strategy, at least in terms of developing the general direction so that DER providers can plan for new frequency services as companies such as ours develop and roll out technology, which we are doing now.

FSR6: System Strength. The tone of this section is one of command and control. The tone needs to change to enabling and using markets to drive outcomes. For example, FSR 6.2 states *"Amend Code to require DER to support performance criteria"*. Instead 6.2 should be along the lines of *"Amend Code to enable DER to support system strength"* and should closely link to 6.3 which is about market products and tools.

FSR7: Accommodating future changes within technical requirements. We strongly support this section and its focus on updating the Code and the relevant power management tools within the next three years.

FSR8: Leveraging new technology to enhance ancillary services. We support the intent of this section but we question the timeline. As outlined above we will be using DER to provide reserves some four years ahead of the roadmap timelines. FSR 8.3 states *"Update market system to enable DER to provide existing ancillary services"* and proposes a four-year time frame. Within four years we would like to see clear actions that enable DER to provide new and improved ancillary services, not just existing ancillary services.

FSR9: Cyber security. Agree with the sentiment of this section.

FSR10: Growing skills and capabilities of the workforce. This is very important. We suggest, for example, a stronger focus in universities on DER so that graduates enter the workforce with an understanding of DER. Further, we support a research programme, like the previous Green Grid programme, that enables researchers to explore DER, work with industry and via knowledge sharing train the workforce of the future, assist with enhancing technical standards, support the development of industry practice and the like.